While many CP can be self-pollinated by hand, cross-pollination is desirable and can be accomplished by taking pollen on a brush from one plant and gently brushing the stigmas of the flowers on another plant, and doing the reciprocal. Thus you cross-pollinate two flowers at the same time. There is very little knowledge about which CP are actually *self-sterile*, as it is termed. The more common situation is the following:

Mechanical prevention of self-pollination: In this case, the stamens and pistils of each flower are positioned in such a way that the stamens can never deposit pollen on their own stigmas--an insect (or human!) must intervene. Usually the flowers are irregular in shape and the stamens and pistils are hard to see; you almost have to dissect the flower to find them. Thus, hand pollination is difficult and practice is needed. In all cases, however, nature has "fixed" it so that certain insects are perfectly adapted to "fit" into each species of plant's flower. Thus, each size and shape of flower attracts a particular size and shape insect to pollinate it, sometimes exclusively. This keeps natural hybridizations between species to a minimum.

The CP which exhibit this situation are *Utricularia*, *Pinguicula*, *Sarracenia*, and *Darlingtonia*. Small bees and flies effectively pollinate the former two; while large bees, such as bumble bees, work on the larger flowers of the latter two. Very little work has been published on the pollination biology of CP.

To cross these types at home, you must first find the stamens, then transfer pollen by brush to the stigma of another flower on the same plant, or more likely, different plant (depending on whether or not that species is self compatible). *Sarracenia* are self-compatible. Try different combinations and keep records of your crosses and see what works.

IMPERFECT FLOWERS

Separate male and female plants: In CP, there is one situation where cross-pollination is absolutely ensured. This occurs in *Nepenthes* where the flowers on a given plant are *unisexual*, either male or female, but not both. The plants are thus either male or female. (In some other species of plants, the male and female flowers may be in different places on the same plant.) In *Nepenthes*, then, an insect *must* carry pollen from one plant to another. In nature this may sometimes present a problem if the two plants are not growing near one another; but usually the insect can locate the opposite sex with no trouble. In cultivation, it is another problem because female plants of *Nepenthes* are relatively rare; and when a grower has both sexes, they may not always bloom at the same time as they do in nature. When they do coincide, it is a simple task to transfer pollen. If you are dealing with the same species, or two species which are capable of hybridizing, good seed set should occur.

(To be continued)

In the next issue:

"Unseasonal Blooming in *Sarracenia* in Western Florida" by Landon T. Ross
"Of Barn Swallows and Droseras" by Owen Tallman
"Building Your Own Solar Water Distiller" by Scott A. Richardson
"Carnivorous Plant Companies" by Glenn Claudi-Magnussen
"Where We Came from and Where We Hope to Go" by Joe Mazrimas and Don Schnell

REVIEW OF RECENT LITERATURE

Casper, S.J. and K. Kondo. 1977. A new species of *Pinguicula* from Mexico. Brittonia 29:112-115.
Annual or bienniel *Pinguicula sharpii* (Sect. *Isoloba*, 2n=16) from Chiapas, Mexico is described for the first time. The plant is quite small and must be reproduced by seed.

Chhabra, S.C., Gupta, S.R., Seshadri, T.R. and Sharma, N.D. Chemical investigation of Dikamali gum: Isolation of two new flavones. Indian J. Chem Sect B Org. Chem Incl. Med. Chem. 14(9):651-653 1976.
Two new flavones were isolated from the above gum. One of them is isoscutellarein which was previously isolated from *Pinguicula vulgaris*.

Clancy, F.G. and Coffey, M. Acid phosphatase and protease release by the insectivorous plant *Drosera rotundifolia*. Can J. Bot. 55(4):480-488 1977.
When plants were given gelatin, enzymes were released 1-2 days after feeding. Maximum was reached after 4 days and declined. Both enzymes had optimal activity at acid pH. The authors discuss the apparent induction of the acid phosphatase enzyme.

Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada. L.H. Bailey Hortorium, Cornell Univ. 1290 p. Macmillan Pub. Co., New York, N.Y. 1976. $99.50
This 7 lb. book is a monumental opus which is concise and is really a dictionary, not an identification manual, on many types of plants including our beloved CP. This dictionary joins the other classic productions from the Bailey Hortorium which also describe CP in historical perspective. They are: Cyclopedia of American Horticulture (1900-1902), Standard Cyclopedia of Horticulture (1914-1917), Hortus (1930), Hortus Second (1941), and Manual of Cultivated Plants (1940, 1949).

Jung, W., *Utricularia* turions (winter buds) from the interglacial period of Zeifen/upper Bavaria. Mitt. Bayer Staatssamml. Palaeontol. Hist. Geol 16, 99-104 1976.
A number of hairy turions were found in West Germany in the Eemian (Quaternary) which were determined to be of the genus *Utricularia*.

Kohlmeyer, J. New records of angiosperms and terrestrial fungi from Carteret Co., N.C. J. Elisha Mitchell Sci. Soc. 92(1):27-30 1976.
One of the rare plants listed is *Sarracenia rubra*.

Komiya, S. Exotic species of the Lentibulariaceae in Japan Part 2. Bull. Nippon Dental Univ., Gen. Ed. Vol 6 1- 21 (1977).
This article diagrams and pictures 25 species of carnivorous plants grown in Japan belonging to three genera: *Pinguicula, Polypompholyx* and *Utricularia*.

Kondo, K. Segawa, M. & Nehira, K. A cytotaxonomic study in four species of *Drosera*. Mem. Faculty Integrated Arts & Sciences. Ser. IV, Vol. 2:27-36 1976.
The chromosome numbers of three species of *Drosera* are: *D. dichrosepala* Turcz. (2n=18), *D. pulchella* Lehmann (2n=18), and *D. pygmaea* DC. (2n=28). The basic chromosome number of the former two species, X=9, may cover the gap between X=8 and X=10 in the aneuploid *Drosera*. The *D. adelae* F. Muell listed here (2n=30) differs from that published previously (2n=28; Kondo 1976).

Lichtner, F.T. and S.E. Williams. 1977. Prey capture and factors controlling trap narrowing in *Dionaea* (Droseraceae). Amer. J. Bot. 64:881-886.
Having defined and described the nature of and action potentials involved in the fast phase of closure, the authors now turn to aspects of capture and the second or "narrowing" ("sealing") phase of closure. The data indicate that this latter phase as well as secretion are initiated by mechanical stimulation (action potentials detected on trap surface for many hours after capture) and maintained by chemical stimulation (of hemolymph contents) after death of the prey. Various chemical substances were evaluated for their effects (or lack of effect) on narrowing and secretion by instillation into closed traps in the laboratory, and results are tabulated. A list of field prey indicates that there is no particular attraction to particular insects and most seem to be trapped as they wander in or seek a resting place. Nearly a third of such prey in June in the study location were ants, another 27% were spiders, and flies were only 2%. This is an information packed study and must be read in its entirety by serious students. (Reprints available from author for $0.50 in U.S. Address: S. E. WILLIAMS, Dept. of Biology, Lebanon Valley College, Annville, PA 17003)

Paul, S.R., New plant records for Bihar from Netarhat Plateau. I. Botanique (Nagpur) 7(1):29-32 1976.
This paper reports among other plants that *Drosera peltata* is a new species in Bihar State in India.

Schnell, D.E. 1977. Infraspecific variation in *Sarracenia rubra* Walt.: Some observations. Castanea 42:149-170.
Five infraspecific disjunct variants of the species are described, discussed and illustrated. The author feels there is insufficient discontinuity of characters to declare any of these separate species, and detailed reasoning and comparisons are offered. It is recommended that the combination *S. rubra* ssp. *jonesii* be retained and that it not be re-elevated to species level as recently proposed by another author. Two recently described "species" from this group are reduced to subspecies: *S. rubra* ssp. *alabamensis* and *S. rubra* ssp. *wherryi*. (Reprints: D.E. Schnell, Rt. 4, Box 275B, Statesville, NC 28677)